

# **Assured Access to the Maritime Battlespace**

## **Warfighting Requirements**



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22 Oct 2012

Report Documentation Page				Form Approved OMB No. 0704-0188	
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1. REPORT DATE <b>22 OCT 2012</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2012 to 00-00-2012</b>	
4. TITLE AND SUBTITLE <b>Assured Access to the Maritime Battlespace: Warfighting Requirements</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>Oceanographer of the Navy,OPNAV N2/N6E,875 N. Randolph Street, Suite 1425,Arlington,VA,22203-1995</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES <b>Presented at the ONR 2012 Naval Science and Technology (S&amp;T) Partnership Conference and ASNE Expo on Oct. 22-24, 2012, Arlington, VA.</b>					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>14</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			



# ***CNO's Direction***



## **CNO's Tenets**

- ◆ Warfighting First
- ◆ Operate Forward
- ◆ Be Ready



**CNO → SSG XXXII:**

- Develop concepts for Navy to maintain its undersea superiority through 2030.
- To keep our undersea advantage, we need a combination of new operating concepts, innovative technology, and the continued proficiency and confidence of our Sailors.





# ***Air – Sea Battle***

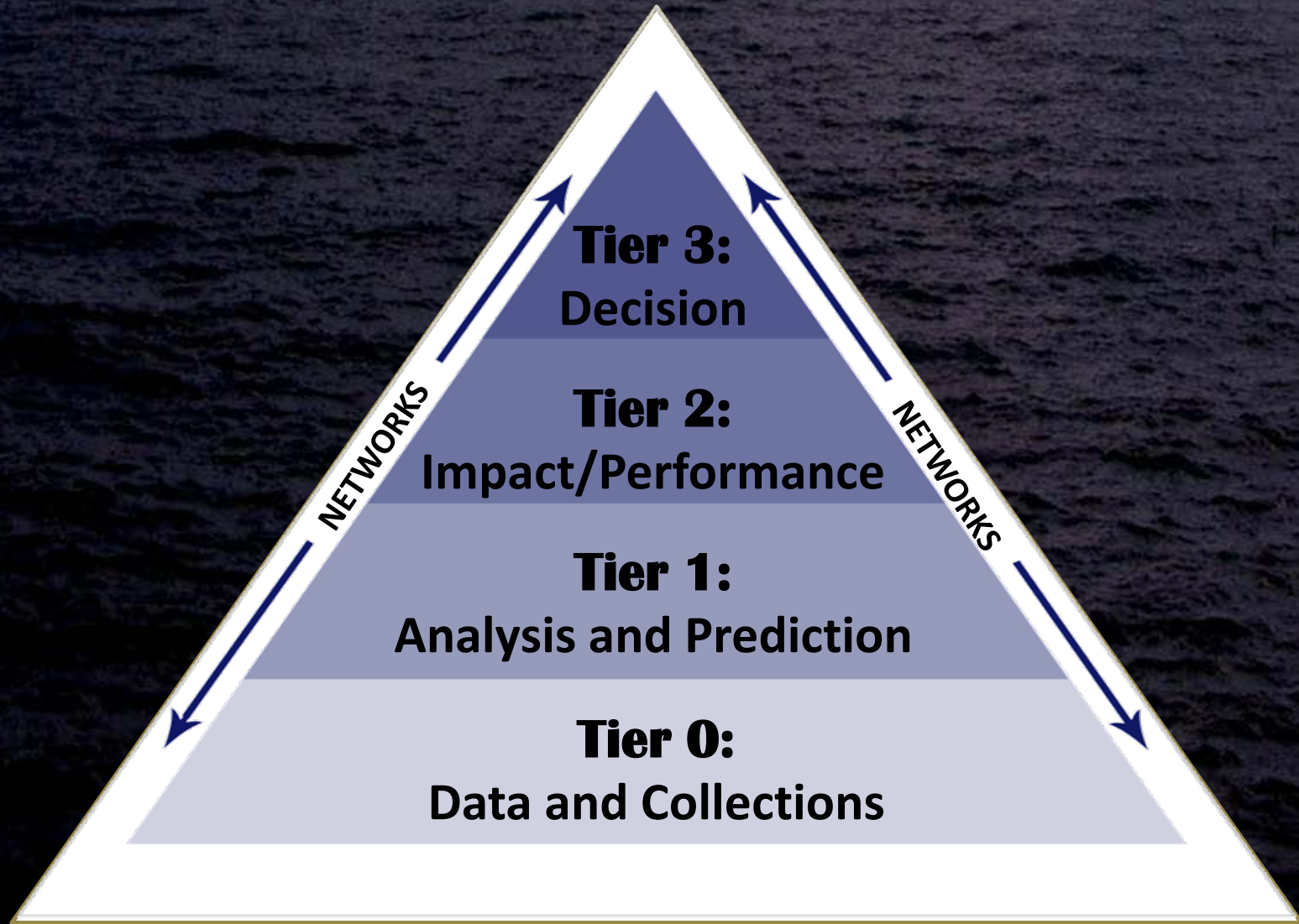




# *Information Dominance Warfare*

## *Achieving Decision Superiority*

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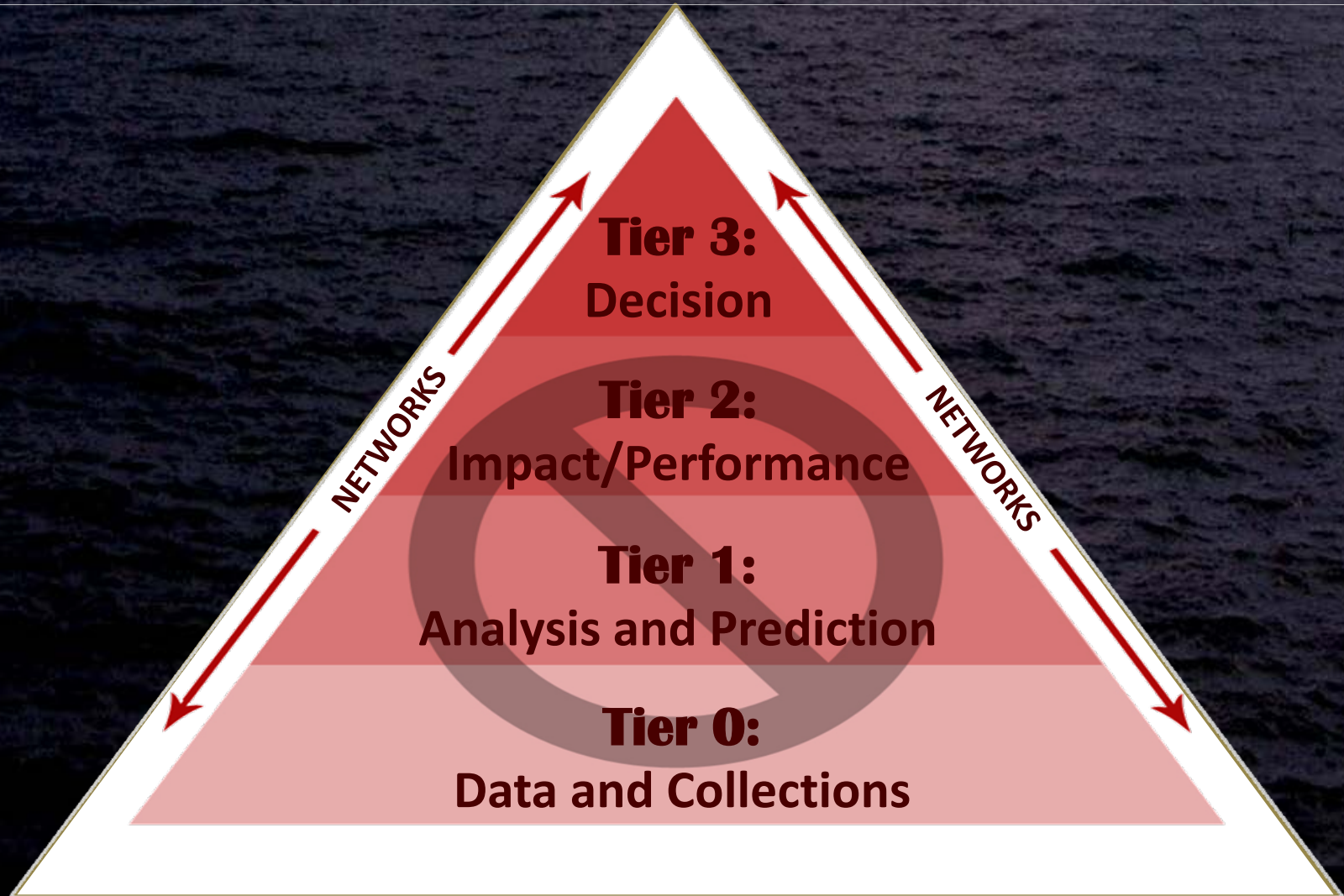


**Decision Superiority: Making better decisions faster than the adversary**

# *Information Dominance Warfare*

## *Achieving Decision Superiority*

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**Decision Superiority: Making better decisions faster than the adversary**





# Battlespace On Demand

## Linking Data to Decisions



Decision Superiority: Making better decisions faster than the adversary

**Decision**

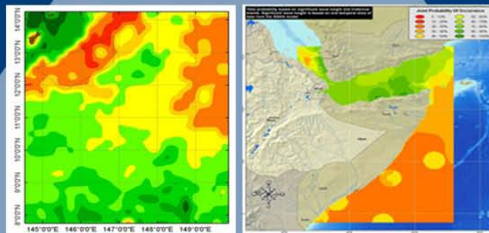


Options  
Courses of Action  
Sensor Employment

Asset Allocation  
Timing  
Quantified Risk

**3**

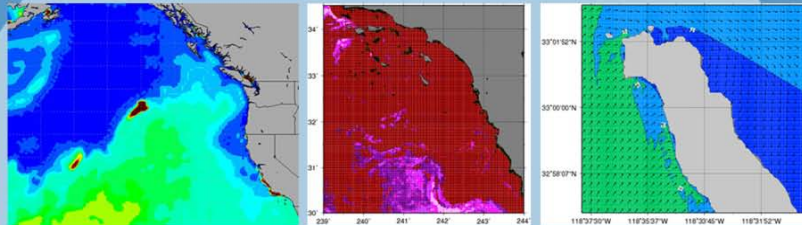
**Performance**



How the predicted environment  
affects the Fleet and Joint Forces

**2**

**Environment**



The predicted environment

**1**

**Data**



Observations,  
measurements,  
satellites, gliders,  
buoys, etc.

**0**

INITIAL AND BOUNDARY CONDITIONS



# Battlespace On Demand

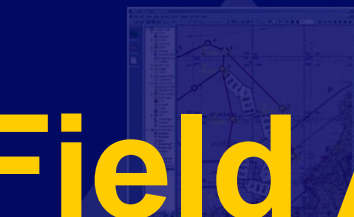
## Linking Data to Decisions



Decision Superiority: Making better decisions faster than the adversary

# Home Field Advantage ... at the Away Games

Decision  
Performance  
Environment  
Data

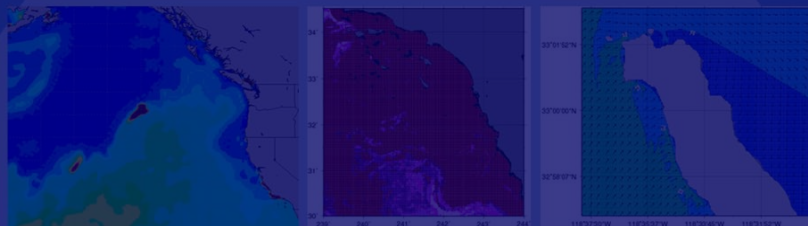


Options  
Courses of Action  
Asset Allocation  
Timing

3



2



The predicted environment

1



Observations,  
measurements,  
satellites, gliders,  
buoys, etc.

0

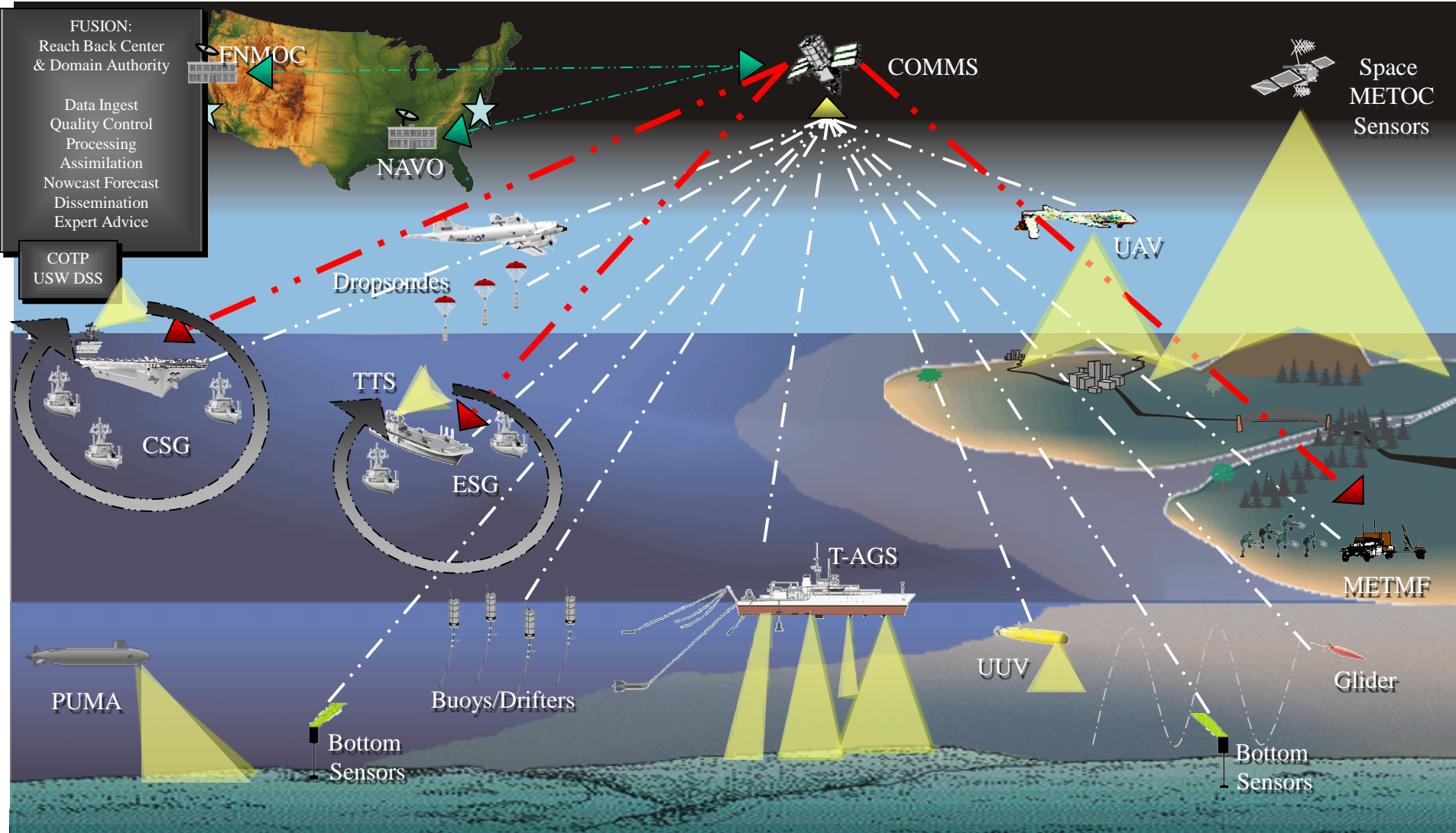
INITIAL AND BOUNDARY CONDITIONS





# Future Operational View

## Battlespace Sensing Fusion & Integration

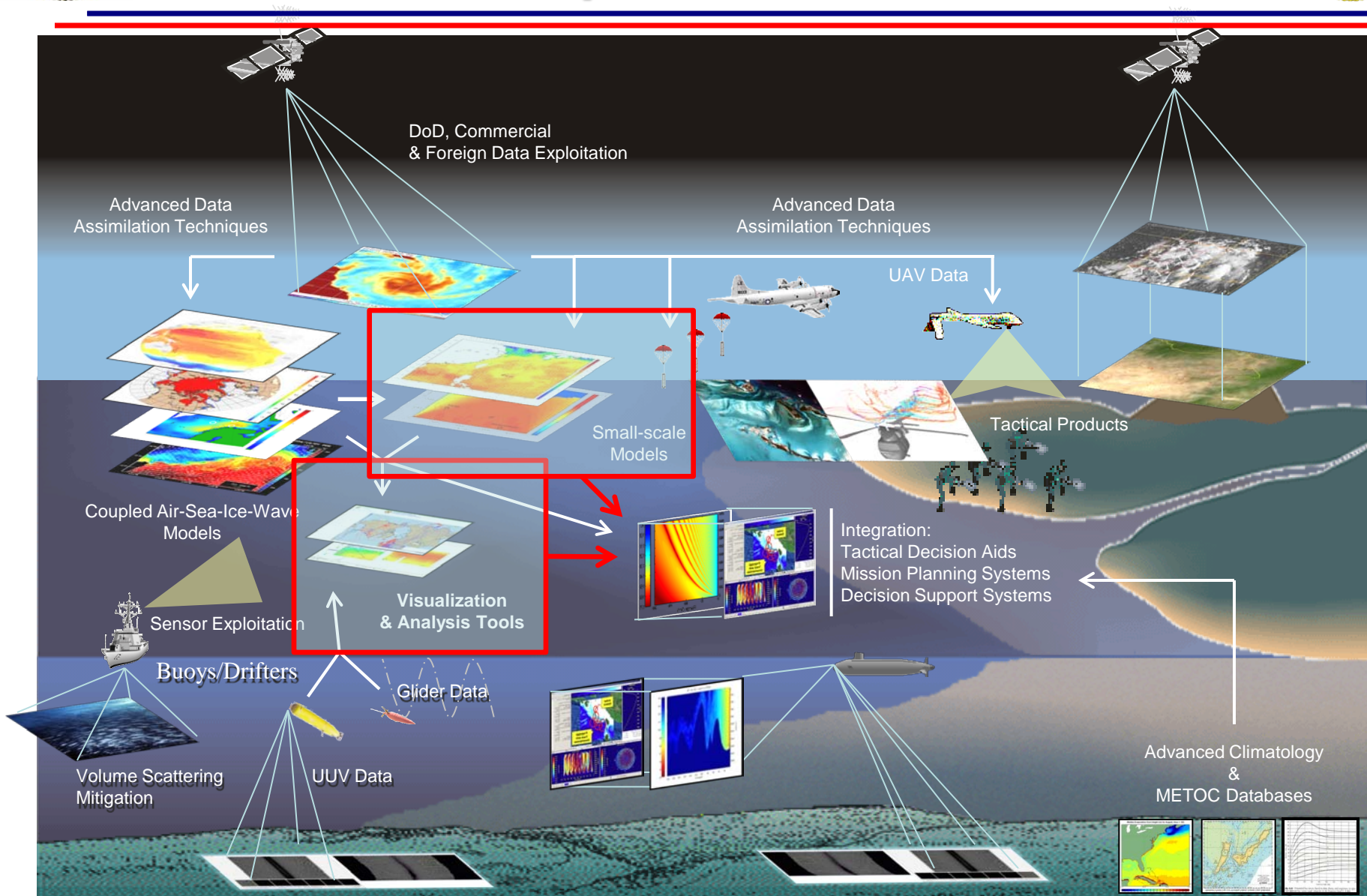


REA = Rapid Environmental Assessment  
M2M = Machine to Machine  
TDA = Tactical Decision Aid

SPP = Sensor Performance Prediction  
COTP = Common Operational Tactical Picture  
USWDSS – Undersea Warfare Decision Support System



# All Source Data Fusion & Visualization ... In a “competitive” environment





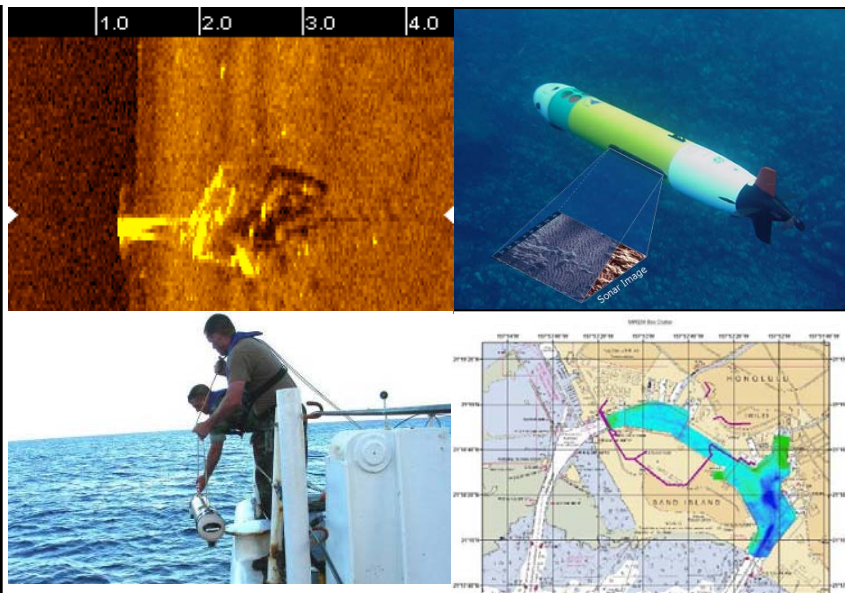
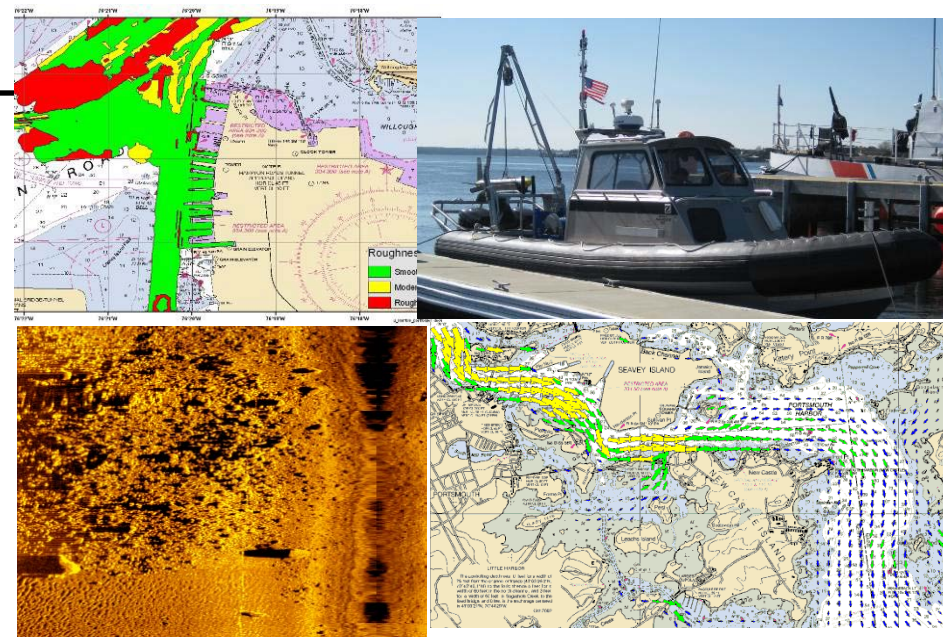


# Mine Warfare: An IDW Example



## Port & Harbor Surveys

- Continuous Intelligence Preparation of the Environment
  - Baseline high resolution side scan sonar surveys
  - Near shore current modeling
  - Optical properties
- Port Folders: key infrastructure, survey and oceanographic data, MCM plans



## Operational Response Capability

- UUV Platoon
  - Rapid responder/force multiplier
  - Developing tactics and procedures in complex confined areas
- Data Fusion Cell
  - Provides on-scene tactical support

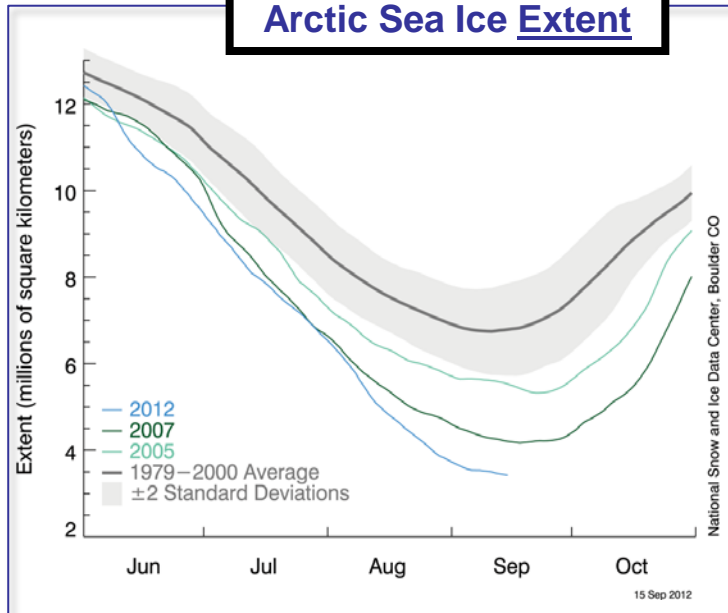




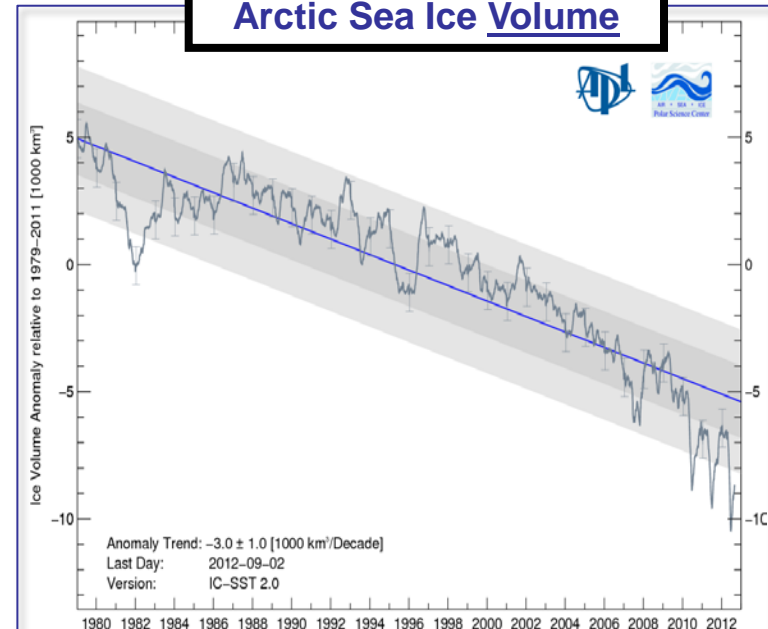
# Changing Climate and Arctic



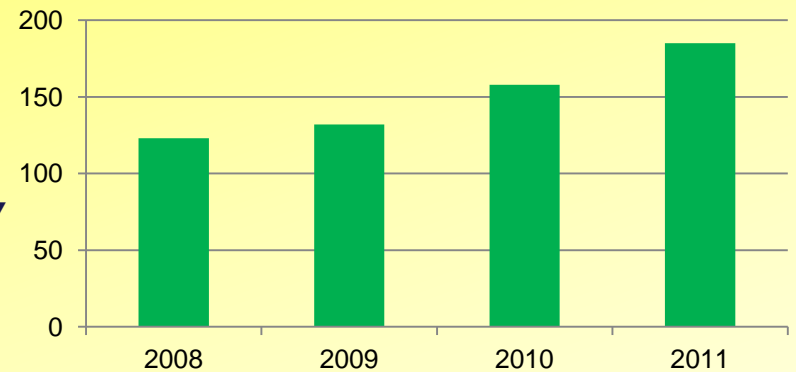
## Arctic Sea Ice Extent



## Arctic Sea Ice Volume



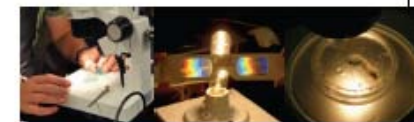
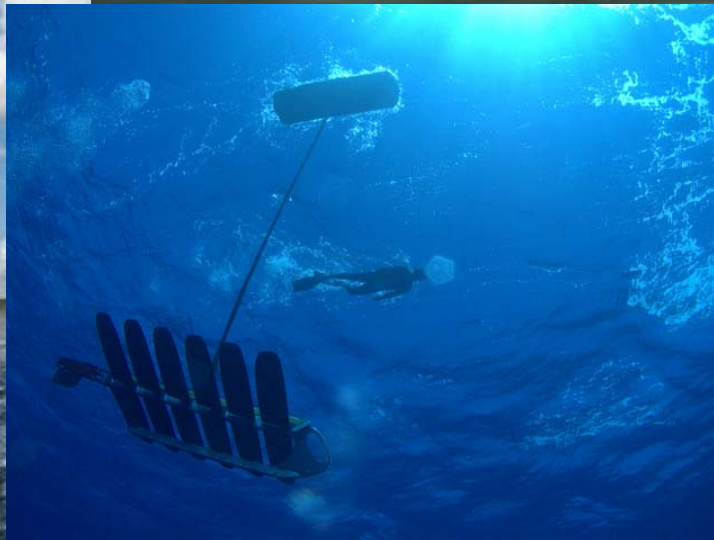
## North Bering Strait Activity





# U.S. Navy

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NAVAL ACADEMY



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# ***Assured Access to the Maritime Battlespace***



## ***The Warfighting Requirements?***

- ***Information Dominance***
- ***Sensor superiority***
- ***Assimilation, Modeling, and Exploitation superiority***
- ***Assured cross-domain PNT***
- ***Cross-domain C4I***
- ***Allied cooperation***
- ***Automation → end-to-end***



